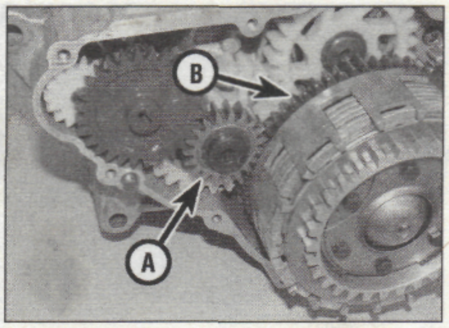


13.45 Ensure the crankshaft pinion (A) and primary driven gear (B) engage fully

44 Install the clutch springs, the spring plate and the locking plate, then install the spring bolts and tighten them finger-tight. Tighten the bolts evenly and a little at a time in a criss-cross sequence to the specified torque setting.

45 Slide the clutch assembly onto the transmission input shaft **(see illustration 13.8)**. Ensure the crankshaft pinion and primary driven gear engage fully **(see illustration)**.

46 If removed, install any washers onto the gearchange shaft **(see illustration 13.7c)**.

47 If removed, insert the dowels in the crankcase and fit the new gasket onto them. Check the condition of the gearchange shaft oil seal (see Section 15, Step 11).

48 Fit the clutch cover, then install the cover bolts and tighten them evenly, in a criss-cross sequence, to the specified torque setting **(see illustration 13.6)**.

49 Install the remaining components in the reverse order of removal. Refill the transmission with oil and adjust the clutch cable freeplay (see Chapter 1).

50 Check the operation of the clutch before riding the machine on the road.

Type 123 engines

51 Fit the new O-ring on the transmission input shaft, then install the clutch housing and the thrust washer **(see illustration 13.20)**.

52 Coat each clutch friction plate with clean transmission oil prior to installation, then build up the plates on the clutch centre – start with a friction plate, then a plain plate and so on. The last plate to be fitted is a friction plate. Align the tabs of the friction plates.

53 Install the pressure plate, then grasp the assembly and install it onto the input shaft – press the assembly all the way on so that approximately 1 mm of shaft protrudes out from the clutch centre.

54 Install the lock washer. Apply a suitable non-permanent thread-locking compound to the threads of the clutch centre nut and install the nut. Tighten the clutch centre nut to the specified torque setting, using the method employed on removal to lock the input shaft (see Step 22). **Note:** *Check that the clutch centre rotates freely after tightening.* Bend up the edge of the lockwasher to secure the nut.

55 Install the clutch springs, the spring plate and the locking plate, then install the spring bolts and tighten them finger-tight. Tighten the bolts evenly and a little at a time in a criss-cross sequence to the specified torque setting.

56 If removed, install any washers onto the gearchange shaft.

57 If removed, insert the dowels in the crankcase and fit the new gasket onto them. Check the condition of the gearchange shaft oil seal (see Section 15, Step 11).

58 Fit the clutch cover, then install the cover bolts and tighten them evenly, in a criss-cross sequence, to the specified torque setting **(see illustration 13.18)**.

59 Connect the tachometer cable to the union on the crankcase and tighten the knurled ring **(see illustration 4.21)**.

60 Install the remaining components in the reverse order of removal. Refill the transmission with oil and adjust the clutch cable freeplay (see Chapter 1).

61 Check the operation of the clutch before riding the machine on the road.

14 Tachometer drive and primary drive gears

Note: *This procedure can be carried out with the engine in the frame. If the engine has been removed, ignore the steps that do not apply.*

Tachometer drive

1 On Type 123 engines the tachometer is cable driven from the left-hand side of the engine unit. First remove the fairing left-hand side panel (see Chapter 8).

2 To access the cable drive shaft, first unscrew the knurled ring securing the tachometer cable to the union on the crankcase and displace the cable **(see illustration 4.21)**.

3 Unscrew the cable union and lift out the drive shaft **(see illustration)**. Note the O-rings on the union and the shaft.

4 Inspect the end of the drive shaft where the squared end of the cable locates – if the socket for the cable has rounded-off, renew the drive shaft.

5 The drive shaft is driven by a helical gear on the front of the oil pump driven pinion; to inspect the helical gear, first remove the clutch cover (see Section 13).

6 Remove the oil pump driven pinion **(see illustration 11.10b)**. Note the thrust washer fitted on the pinion shaft **(see illustration 11.10c)**.

7 Examine the teeth on the drive shaft and the helical drive on the driven pinion – if there are any signs of wear or damage, renew the shaft and driven pinion **(see illustration)**.

8 Note how the drive shaft locates in the clutch cover **(see illustration)**. Smear the new O-rings on the cable union and drive shaft with grease, then install them in the cover. Tighten the union securely and check that the shaft turns freely.

9 Installation is the reverse of removal. Don't forget to fit the thrust washer on the oil pump driven pinion shaft.

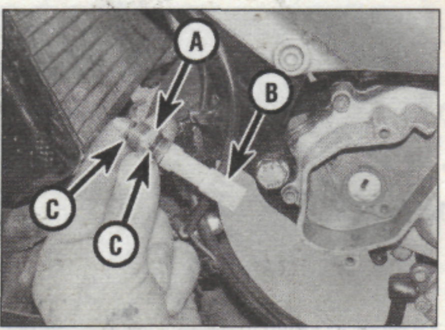
Primary drive gears

Removal

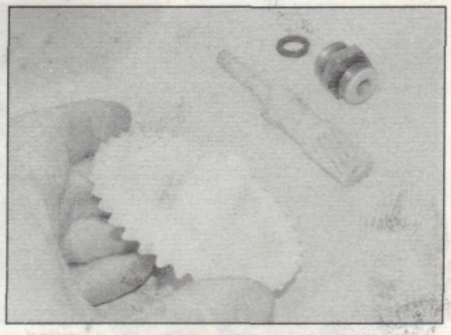
10 Remove the clutch (see Section 13).

11 Remove the oil pump driven pinion **(see illustration 11.10a or 10b)**. On Type 123 engines, note the thrust washer fitted on the pinion shaft **(see illustration 11.10c)**.

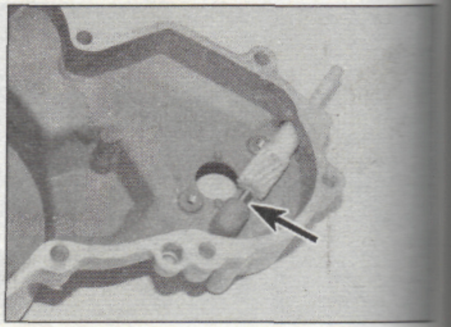
12 On Type 122 engines, use circlip pliers to remove the circlip retaining the crankshaft



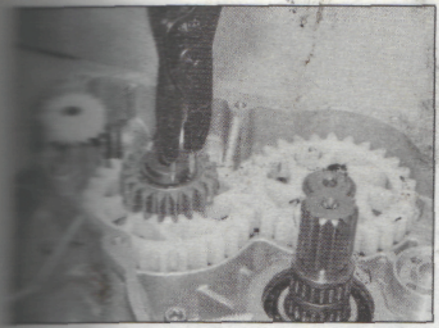
14.3 Remove the cable union (A) and drive shaft (B). Note the O-rings (C)

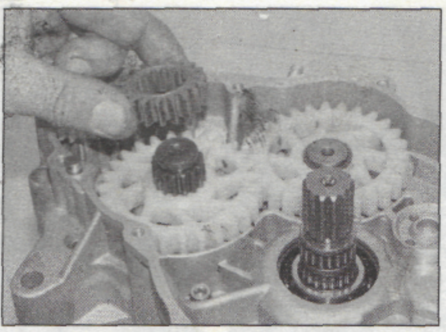


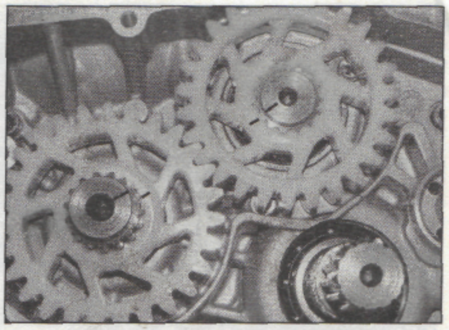
14.7 Examine the teeth of the tachometer drive gears



14.8 Lower end of tachometer drive shaft locates on pin (arrowed)


14.12a Remove the circlip . . .


14.12b . . . and draw the crankshaft pinion off


14.14a Note the alignment of the timing marks on the shafts and the gears

gear and draw the gear off **(see illustrations)**. Note which way round the gear is fitted.

13 On Type 123 engines, the crankshaft gear is retained by a nut – to undo the nut it is necessary to stop the crankshaft from turning. If the engine is in the frame, engage first gear and have an assistant hold the rear brake on hard. Alternatively, or if the engine has been removed from the frame, refer to Section 10, Step 6, and use another of the suggested methods to hold the alternator rotor. **Note:** *Do not hold the alternator rotor nut – it is tightened to the same torque setting as the crankshaft gear nut and may come loose in the process.* Undo the crankshaft gear nut and remove the spring washer – discard the washer as a new one must be used. Draw the crankshaft gear off, noting which way round it is fitted; note the location of the Woodruff key in the shaft and remove it for safekeeping if it is loose.

14 Note the alignment of the timing marks on the two gears, the crankshaft and the balancer shaft – turn the engine over until the marks align **(see illustration)**. Also note that the gear on the crankshaft is fitted shoulder facing out and the gear on the balancer shaft is fitted shoulder facing in **(see illustration)**.

15 Remove the circlip retaining the balancer shaft gear and draw it off, then draw off the crankshaft gear **(see illustration)**. If the gears are a tight fit on their shafts, heat them with a hot air gun and use a two-legged puller to draw them off **(see illustration)**.

Inspection

16 Inspect the teeth on the crankshaft and balancer shaft gears for wear and damage. If required, renew the gears as a pair. Note that the gears must be renewed at the specified service interval even if they appear to be in good condition (see Chapter 1).

17 Inspect the teeth on the crankshaft gear – if the crankshaft gear is worn, check the teeth on the primary driven gear on the back of the clutch housing (see Section 13). The crankshaft gear and primary driven gear must be renewed as a pair.

18 Note the O-ring on the crankshaft and discard it **(see illustration)**.

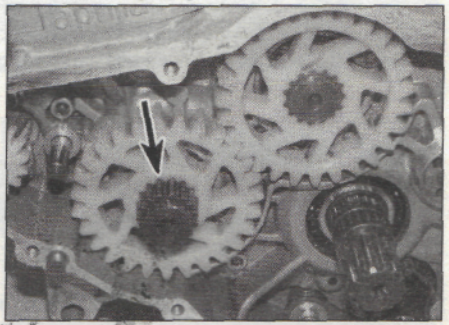
Installation

19 Lubricate a new crankshaft O-ring with grease and slide it carefully onto the shaft.

20 Align the timing mark on the balancer shaft with the mark on the gear and slide the gear on with the shoulder facing in. If necessary, heat the gear gently with a hot air gun to aid installation. **Note:** *It is essential that during the installation procedure, all the timing marks are aligned exactly – if not, the engine will run out-of-balance with a high level of vibration.*

21 Secure the balancer shaft gear with a new circlip.

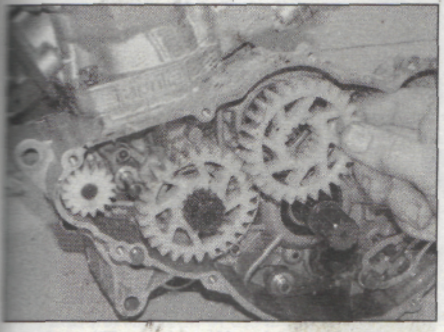
22 Align the timing marks on the balancer shaft/gear with the mark on the crankshaft. Align the mark on the crankshaft gear with the mark on the crankshaft, then slide the gear onto the crankshaft with the shoulder facing out. Ensure the crankshaft gear engages with the balancer shaft gear without disturbing the position of the balancer shaft **(see illustration 14.14a)**.

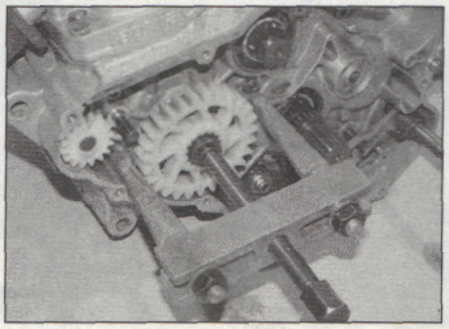

14.14b Shoulder (arrowed) on crankshaft gear faces out

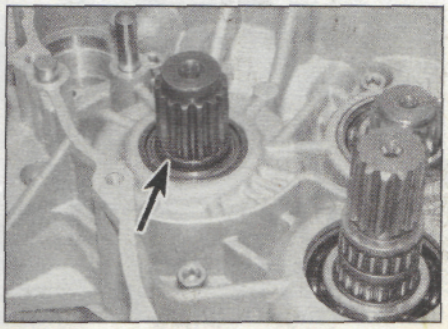
23 On Type 123 engines, install the crankshaft gear with its recessed side facing out and secure it with a new circlip.

24 On Type 124 engines, clean the threads on the end of the crankshaft and the crankshaft gear nut with a suitable solvent. If removed, install the Woodruff key in the crankshaft, then slide on the gear with its recessed side facing out. Fit a new spring washer. Apply a suitable non-permanent thread-locking compound to the threads of the crankshaft nut and install the nut. Tighten the crankshaft nut to the specified torque setting, using the method employed on removal to lock the input shaft (see Step 13).

25 Install the remaining components in the reverse order of removal.


14.15a Draw the gears off by hand . . .


14.15b . . . or use a puller if necessary


14.18 Renew the crankshaft O-ring (arrowed)